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THE ATTENUATION OF HOG-CHOLERA VIRUS *

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Many attempts have been made to modify the virus of hog cholera. The results have thus far been quite unsatisfactory. Graham and Brueckner[1] concluded from their studies that virus attenuated by heat is worthless in rendering swine immune to cholera. Craig[2] reached much the same conclusion. Lewis and others[3] apparently protected 4 pigs with blood drawn from a hyperimmune hog 24 hours after hyperimmunization.

During the summer of 1914, while working on the etiology of hog cholera, at the suggestion of Dr. Kastle we endeavored to modify hog-cholera virus by incubating at 37 C. a mixture of virus blood and hyperimmune blood.

Three cubic centimeters of fresh noncarbolized defibrinated hog-cholera blood were obtained as aseptically as possible and placed in a sterile Erlenmeyer flask; 20 c.c. of hyperimmune defibrinated blood containing 0.5% carbolic acid were added to the virus blood. The hyperimmune blood had been at 10 C. for 6 weeks. The flask was then placed at 37 C. At the end of 24 hours the appearance of the preparation was unchanged. At the end of 48 hours the preparation was of a deep chocolate color, and somewhat thickened in consistency, with some precipitation. At the end of 48 hours at 37 C. the preparation was given to 2 normal hogs weighing about 100 lb. each. The hogs each received 10 c.c. of the preparation by hypodermic injection into the muscles of the right inner ham.

For 2 weeks following the injections the animals remained normal, their temperatures ranging from 101 to 103 F. They were then placed in the exposure pens. The following are the temperature charts for these hogs during the period of their exposure in the cholera pens. On August 1, 1914, these hogs being normal were given to the serum laboratory.

We made a further attempt to modify hog-cholera virus by incubating at 37 C. a mixture of virus blood and the fresh serum of an animal other than the hog.

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[1] Jour. Med. Research, 1915, 31, p. 557.

[2] Ann. Rep. Purdue Univ. Agr. Exper. Sta., No. 28, 1914, p. 73.

[3] Bull. Okla. Agr. Exper. Sta., No. 104, 1914.

HOG 67, JULY, 1914

11	12	13	14	15	16	17	18	20	21	22	23	24	25
103.5 F.	102.8	103.8	104	103.8	103.4	104.6	104.1	101.3	101.8	101.2	101.8	102.1	101.6

HOG 68, JULY, 1914

11	12	13	14	15	16	17	18	20	21	22	23	24	25
100.6 F.	101	101.3	102.2	101.8	102.5	102.2	102.3	101	103	102.5	101.6	101	101.2

Four and five-tenths cubic centimeters of fresh noncarbolized defibrinated hog-cholera blood were obtained as aseptically as possible and placed in a sterile Erlenmeyer flask; 30 c.c. of normal rabbit serum were added to the virus blood. The flask was then placed at 37 C. At the end of 24 hours there was some precipitation together with a slightly increased cloudiness. At the end of 48 hours the preparation was unchanged. It was then given to 3 normal hogs weighing about 100 lb. each. The hogs each received 10 c.c. of the preparation by hypodermic injection into the muscles of the right inner ham.

For 10 days following the injections the animals remained normal; on the 11th day, however, Hogs 70 and 71 did not seem well and would not eat. On the 12th day they were sick and had diarrhea. This sickness continued until they died, Hog 70 dying on the 22nd day following the injection, Hog 71 on the 16th day. Postmortem examination revealed acute hog cholera in each case.

The third hog in this series remained normal for 2 weeks following the injection, the temperature ranging from 100.2 to 103.6 F. At the end of 2 weeks this hog was placed in the exposure pens together with Hogs 67 and 68. The following is the temperature chart for Hog 69. (Hogs 70 and 71 developing a fatal cholera from the original injection, were not placed in the exposure pens.) August 1, 1914, Hog 69 being normal was given to the serum laboratory.

HOG 69, JULY, 1914

11	12	13	14	15	16	17	18	20	21	22	23	24	25
102.2 F.	102.1	101.8	102.3	101	101.5	101.4	102.1	100	100.6	101	101	101.3	101.3

It is of course impossible to draw positive conclusions from such a small number of experiments, yet we may conclude that, in so far as these experiments go, the virus of hog cholera on incubation with hyperimmune blood for 48 hours at 37 C. is so modified that when injected it will no longer render normal hogs sick, but will protect them when later they are exposed to cholera. We may further conclude that the virus of hog cholera on incubation with normal rabbit serum for 48 hours at 37 C. is modified to the extent that 1 of 3 animals was protected against cholera.

It is quite possible that the mixture of hog-cholera virus and hyperimmune blood which had been modified by incubation for 48 hours at 37 C. and then rapidly dried over sulfuric acid at a low temperature, would indefinitely retain its power to protect hogs against cholera, and yet not sicken them.